Towards an Analytical Framework to Benchmark the Performance of Urban Drinking Water Supply: Preliminary Findings from Ambo, Ethiopia.

Bacha Kebede Debela[1] (Ambo University, Ethiopia) &

Dr. Steve Troupin[2] (KU Leuven University, Belgium)

Abstract: *This paper aims at developing an analytical framework to assess the performance of Ethiopian municipalities in supplying urban drinking water. Therefore, it operationalizes Pollitt and Bouckaert's (2004) production process model to identify major inputs, activities, outputs and outcomes in urban drinking water service, and identify strategies to improve the efficiency and/or the effectiveness of local government in urban drinking water service. Data is collected in Ambo (Ethiopia) through document analysis, interview and focus group discussion. Reliance on this latter method moreover allows drawing hypotheses about the impact of a structural involvement of citizens in the water delivery production process on its overall performance, to be tested in further research. We find that most performance improvement strategies don't imply a trade-off between efficiency and effectiveness, and that, when these objectives do conflict, citizen tend to prefer effectiveness-improving strategies.*

Keywords: Performance, Efficiency, Effectiveness, Participatory governance, Water delivery, Ambo, Ethiopia, Benchlearning.

INTRODUCTION

Access to drinking water remains a precondition for the wellbeing of populations and economic development. This is why UN set a MDG target to halve by 2015 the proportion of population without access to safe drinking water. In line with MDG, Ethiopian Growth and Transformation Plan (GTP) aims at 100% urban potable water coverage within 0,5 km by 2014-5 (MoFED, 2010). In Ethiopia, urban local governments are responsible for the delivery of drinking water and other local services (Oromia National Regional Government Proc.No.65/2003).

Existing studies about the performance of Ethiopian local governments in delivering water service provide two insights. They indicate, first, that improvements are needed: the country is far from meeting its safe drinking water MDG target (Banerjee et al, 2008), has low performance even by African standards, and has the highest absolute number of people without access to improved water – a problem that is even more significant at local government level (Yacob et al, 2010). Second, the different figures they provide (only 58.25% access according to MOFED & UN Country Team Ethiopia

[1] Bacha Kebede Debela is PhD Candidate at KU Leuven (Belgium), and Lecturer at Ambo University (Ethiopia); bachakebede.debela@student.kuleuven.be, debela76@gmail.com.

[2] Dr. Steve Troupin is Lecturer at KU Leuven Public Governance Institute and Strategic Projects Officer at International Institute of Administrative Sciences (IIAS); steve.troupin@soc.kuleuven.be.

(2012); 91.5 % coverage within 0.5 km in urban areas according to MOFED (2010) and 73.3 % coverage within a 1,5 km radius in urban areas in 2012 according to the World Bank (2013)) shows disagreement on how to evaluate local government performance in potable water delivery.

This paper contributes to address these gaps. It is part of a broader research project aiming at benchlearning between Ethiopian municipalities to improve water delivery. That is, the performance of Ethiopian municipalities will be compared by using the non-parametric frontier methods proposed by Stroobants & Bouckaert (2014), and peers of well-performing and poorly performing municipalities will be constituted to learn from each other (Kinder, 2012). This project requires a preliminary consensus about relevant indicators to assess the performance of Ethiopian municipalities in delivering water to its citizens. This paper is a step in that direction. It answers this research question: how to assess government performance in delivering potable water services?

To answer the research question, the study builds on Pollitt and Bouckaert's (2004) production process model. By conceiving an organization, program or department as the deployment of inputs in activities, leading to outputs and outcomes, it provides generic criterions to assess government performance: economy, good management, efficiency, and effectiveness. This paper focuses on efficiency and effectiveness; economy and good management criterion being directly or indirectly imbedded in the two criterions. This paper thus operationalizes this model and provides criteria for evaluating the production process of potable water delivery.

It does this by collecting evidence in Ambo, through interviews with the local water company managers, document analysis and a focus group with citizens' representatives. By relying on a focus group with citizens, our paper allow addressing another research question: can citizens improve government performance? Such an impact could be indirect, if citizens favour one or another operationalization of performance, or direct, if they can help the local water company achieving this performance. Hereby, our paper contributes to the Roundtable Conference's main theme, and fits more precisely to its third sub-theme, "assessing the effectiveness of sustainable partnership in devolved systems".

The paper is organized into four parts. The next section discusses the analytical framework; the production process model. The third section presents the research method used in this paper. The fourth section presents the production process for urban

drinking water supply service. The last section discusses the result of the study and formulates policy recommendations.

ANALYTICAL FRAMEWORK

Many studies of performance management and public sector reform program use the production process model developed by Pollitt and Bouckaert (2004). Figure 1 presents the main elements of the production process model and two generic criterion of performance assessment derived from it.

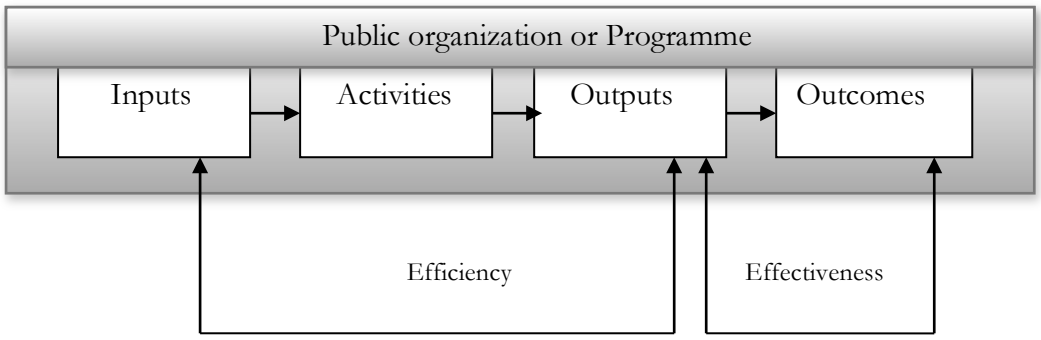

Figure 1 – The Production Process Model (Adapted from Pollitt & Bouckaert, 2004)

Inputs refer to resources (human and non-human) that are deployed by organizations to produce output (Pollitt & Dan, 2013) through activities. Activities are of an operational and management nature, and include organizational structure and arrangements, allocation of authority and working procedures (Dan, 2014). Outputs refer to what an organization or a program delivers or produces (Dan, 2014), and are usually quantifiable. Outcomes are measurements of value and imply what happens in real world as the result of organizational or program output (Dan, 2014). Outcomes are often conditioned by a number of factors and cannot be simply attributed to a single organization or program action (OECD, 2009).

Performance is usually conceived in terms of certain relationships between these inputs, outputs, and outcomes (Pollitt & Dan, 2013). Efficiency refers to the ratio of inputs over outputs (Van Dooren, et al., 2010). Accordingly, an organization/policy is performing well if it maximizes the outputs produced with a given set of inputs (output oriented) or if it minimizes inputs used to produce a given set of outputs (input oriented) (Jacobs, et al, 2006; Van Dooren, et al., 2010). Effectiveness usually refers to the extent to which the original goals or objectives set for the organization or program have actually been realized through the outputs provided (Dan, 2014; Pollitt & Bouckaert, 2011; Woodybury & Dollery, 2004; Ammons, 1996).

The dynamic interaction among elements of production process model indicates that performance management is an ongoing and cyclical process. In general, the analytical framework is useful to assess, compare and benchmark performance in public sector (Van Dooren, et al., 2010; Pollitt & Bouckaert, 2011; OECD, 2009). Consequently, the production model is used to identify relevant and feasible variables associated to each element (inputs, activities, outputs and outcomes) to benchmark the performance of urban local government potable water service. The model also helps to activate dialogue between citizens and local government officials, and assess the effectiveness of sustainable partnership between and among these actors.

RESEARCH METHOD

This paper aims at operationalizing Pollitt & Bouckaert's production process model for water delivery or, in other words, at identifying the inputs, activities, outputs and outcome of water delivery process, and coining what an efficient and effective water delivery concretely means.

There is abundant international literature detailing the water delivery process and devising criterions to evaluate its performance. The United Nations, notably, has set Millennium Development Goals regarding access to water, and has coined and defined a human right to water (UN, 2010). The World Health Organization has set essentially technical standards of water quality (World Health Organization, 2004), and developed a risk management approach for water companies to comply with these standards (WHO, 2009). The International Water Association has further developed this management approach to water delivery (IWA, 2013).

A review and synthesis of international standards would thus have allowed answering our main research question. However, there was a risk that the performance indicators synthesized this way correspond more to the imperatives of the international community than to the wishes of the local population, what would have biased our benchlearning exercise. In order to avoid such a bias, we wanted to collect input from the local population.

There is another, more theoretical reason, to rely on local opinions as opposed to international standards. Indeed, Ethiopia has been promoting the developmental state doctrine (Zenawi, 2006). According to Leftwich (1994), a developmental state is characterized by its developmental objective, to be achieved by a resolutely interventionist state relatively insulated from internal and external pressure. Post-New

Public Management discourses (Pollitt & Bouckaert, 2011), with their focus on participation, partnership and co-production, suggest, instead, that citizens could and should have a bigger role in policy-making. Assuming that citizens, in compliance with the developmental state doctrine, currently don't have much voice in the water delivery process, we wanted to seize the opportunity offered by this paper to examine whether citizens' input could be of any use in the water delivery process, by organizing a focus group.

This paper thus relies on a single case study of Ambo Urban local government, in Ethiopia, to explore and understand the interaction between elements of production process model. Ambo has been chosen for two reasons. First, Ambo is representative of the other municipalites in the Oromia National Regional Government that will be subjected to the benchlearning exercise. It can thus be expected that the performance indicators relevant for Ambo can apply to the other Grade 2B municipalities (i.e.: between 45 000 and 89 999 residents) of the region. Second, feasibility of the study (time, distance, potential access to relevant data) has been taken into account.

Ambo Urban Water Supply and Sewerage Service Enterprise (AUWSSSE) is responsible for urban potable water service in Ambo. We analyzed its BSC-based strategic plan, annual plan and performance report. This was followed by interviews of AUWSSSE's managers, who were asked to operationalize the water production model of the enterprise. Three customers of AUWSSSE who visited the enterprise to settle water bill, and a hydro-geologist (West Shoa Zone Water, Minerals and Energy Office) and a Civil Engineer (Ambo University lecturer and researcher) were also interviewed. Annex 1 presents the profile of interviewees and major issues discussed.

A focus group discussion was organized with representatives of customers of AUWSSSE to get a better insight into their expectations in terms of water delivery. The participants represented NGOs, public sector and university; each having different role in community (resident, leader in a church and private health center operator). Annex 2 presents the profile of focus group discussant and the major issues discussed.

Data from the interviews and focus group were complemented by national water policy and strategy documents and academic literature to synthesize a production model for water delivery, and clarify what an improvement of the efficiency or effectiveness of water delivery concretely implies.

Ambo Town is located in the Oromia National Regional State (Ethiopia) about 110 km to the West of Addis Ababa. Ambo Town is the capital of West Shoa

Administrative Zone of the Oromia National Regional State. The town received a master plan in 1931, due to its strategic position of serving as an administrative, commercial, and transportation centre of Western Shoa. The water supply for the town began in 1952 during the Haile Selasse regime (Shanmughama & Tekle, 2011).

The AUWSSSE was established by Oromia National Regional Government Proclamation No.78/2004. Table 1 presents the main output figures of AUWSSSE.

Year	Urban Population (Estimate)	Volume of water produced (m^3)	Customers			Revenue ($)	Operating expenditure ($)	Source
			HH	Gov.	Bus.			Urban water
2011		791 541	5565	164	174	151 271	164 981	Surface water & Ground water
2012		975 396	6233	172	171	227 943	176 845	Distribution
2013	68 000	1 030 355	7106	174	168	335 839	208 478	network(115km)

Table 1 – Socio-Economic context of AUWSSSE (AUWSSSE, 2013)

The estimated total population of the town is 68,000. In the year 2013 the AUWSSSE produced 1 030 355 m^3 volume of water and served 7 106 households, 174 governmental insinuations and 168 private business enterprises. The enterprise generated about $ 335 000 revenue with total expense of $ 210 000 in 2013. The enterprise uses progressive water tariffs for private connection (the higher the consumption, the higher the price for water service), and flat rate for public stand users. Surface (Hulka River) and underground water (4 in number) are the sources of urban potable water supply (AUWSSSE, 2013).

THE PRODUCTION PROCESS FOR URBAN DRINKING WATER SUPPLY

The urban drinking water service production process model presents inputs, activities, outputs and outcomes of urban water services taking Ambo as case study. Each element of the production model is discussed briefly here under.

Inputs of Urban Drinking Water Supply

Urban water service supply requires different inputs. The major inputs include raw water, human and non-human resources.

The AUWSSSE uses both surface water[3] and ground water[4] to supply water service. The case study suggests that ground water is preferable, because it requires less treatment[5] and it is less subject to variations in terms of quality and quantity (Wutich & Ragsdale, 2008). However, ground water requires more energy (power) to extract and may require treatment (such as aeration and softening) as well.

Availability and qualities of human and nonhuman resource are essential components in water service provision. The financial cost of human and other resources is a viable indicator to analyze the performance of water enterprise. In this respect, the AUWSSSE has eight budget lines: direct material cost; general administrative overhead cost; employee benefits; service cost (electric, telephone etc...); renewal, maintenance and operation cost; advertisement, printing and other services; equipment and supplies (including generator, electric supplies, vehicle spare parts, vehicle tire, cleaning supplies, office supplies, fuel and lubricant, and others and replacement items, such as switches (AUWSSSE, 2011; 2012; 2013)[6]. Organizational documents reveal that the enterprise allocates the highest proportion of its budget for general administrative overhead cost, followed by direct material cost. Interviewees told that the needed human and non-human resources depend on many factors such as source and qualities of raw water (low quality requires high level professionals to treat the water), population served, design and construction qualities of water utilities, and technology used (ageing and deteriorating water related infrastructure requires continuous maintenance and hence need the inflow of inputs for maintenance services (see Zhou et al., 2009; Mersha, 2007). This indicates that proper human and non-human resource planning and supply, and stakeholders' participation are crucial for sustainable water production.

Major activities in Urban Drinking Water Supply

[3] Surface water includes water obtained from rivers, lakes, manmade reservoirs and sea water (UN-HABITAT, 2003).

[4] Ground water is located under earth's surface and the depth at which it locates varies depending on soil structure, rock basement and ground water recharge rate. If it is well recharged, it usually follows to surface as springs

[5] Interviewees and focus group discussants explained that compared to surface water, ground water has little organic matter (and hence has low turbidity) because of the fact that organic matters have been already filtered through natural physical parameters such as soil and rocks (Gadgil, 1998; Mersha, 2007). Accordingly, the AUWSSSE treats water from three boreholes only with chlorination while water from the other borehole (iron rich water) with aeration (see also Fita, 2011). The enterprise obtains about 70% raw water from Huluka River while the remaining is extracted from 4 bore holes (AUWSSSE, 2011; 2012; 2013)

[6] Annex 3 presents major budget lines and major issues.

Urban drinking water supply involves two types of activities: operational activities and management activities. The operational activities include catchment management, water treatment and distribution. Management activities include investment and maintenance decisions (utility and distribution system construction, water line connection, expansion and replacement); commercial policies (water tariff setting, water meter reading and billing, cost of private connection); policies aimed at involving stakeholders in the production process; coordination, quality management, monitoring and control.

Catchment management is concerned with ensuring the availability and quality of raw water. It involves protecting biophysical environment (water, soil, and plant/vegetation) in the upstream areas, and enhancing socio-economic benefits of the community in the area. Proper catchment management helps to protect and develop water resources (steams/springs) and thus enables to sustain water supply. It increases recharge of ground water; reduce cost of extraction because water table is closer to the surface. Overall, proper catchment management requires active participation of stakeholders.

Treating raw water is one of the major operational activities. The intensity of treatment depends on the quality of raw water. According to AUWSSSE's technical staff, surface water first needs to be carried through collection chamber to treatment plants. There, it undergoes two major types of treatments; chemical treatment and mechanical treatment. Chemical treatment involves the addition of substances to coagulate suspended materials and fasten the sedimentation process. Mechanical treatment involves the use of sand stones and different filters to screen out fine items, bacteria and viruses. Filtered water is discharged to the reservoir where disinfection takes places through chlorination. Finally, the chemist (water quality check expert) checks the chemical, biological and physical (colour, odour, temperature) properties and PH of water before it is distributed. Other checks are also performed further in the distribution chain to monitor potential contaminations due to leakages and disconnections.

Treated water is distributed to customers through distribution network. The qualities and coverage of distribution network influence water supply to customers. The better the quality and the coverage of the distribution network, the better the service will be. Interviewees (AUWSSSE) told that treated water is measured by water meter at the gate and distributed through different sized distribution lines. In general, water distribution is a crucial activity in water supply and it requires proper system to avoid

contamination of water in the distribution system, leakages and inequitable distribution of water service.

Investment decision is an important activity in urban drinking water supply. Investment decisions concern water utility (design, construction of treatment plants and reservoir, drilling boreholes and extracting water, building public stand pipe,…), the water distribution system (including water line connection, expansion, replacement and maintenance work) and other civil works. These investment decisions are crucial because they can occasion water losses due to leakages, and the need for maintenance works (Mersha, 2007).

Regarding commercial policies, the most crucial items are water tariff, water meter reading and billing and cost of private water connection. Tariffs and private connection cost, when decoupled from purchase power, threaten access and lead poor and disadvantaged people to use other alternative water sources, including unprotected and unhealthy ones.

Customers also expect a frequent and accurate water meter reading. Frequency allows customer to pay for what they have actually consumed in a month, what is particularly important in case of progressive tariff policy. Timely water meter reading and billing is preferred. Accuracy refers to the trust customers should have that the meter records volumes of water and not of wind in case of interruption of service. Improper meter reading generally results in overcharging customers who can be fined or disconnected if they refuse to pay their bills. Such transactional approach in service delivery restrains citizens-local government partnership and legitimacy of local government: because it restricts citizens from directly influencing local government officials.

To get private connection, the customer should pay permission and estimation fees, a technical service charge (usually 40%) and cover the costs of connection materials (see also Fita, 2011). Thus, although the price of water through private connection is lower, initial cost of private connection is less tolerable to the poor and even by people who live far away from distribution line.

The operationalization of all activities requires proper stakeholders participation and partnership management; resource deployment and management; coordination, monitoring and control. According to interviewees and focus group discussants stakeholders participation and partnership management activities are crucial issues in

water supply. Active participation and cooperation of all actors (including local community living in the catchment area) is essential. Resource mobilization, deployment and management are needed to perform the activities of enterprise and enhance stakeholders' participation. This involves acquisition, distribution and management of nonhuman resources (tools, finance, equipment, supplies etc...) and human resource management (human resource management: planning, recruitment and selection, training and development…). Overall the operationalization of organizational activities requires proper organization, coordination, communication, monitoring and controlling. It also requires a provisional approach to service delivery rather than a transactional approach. The provisional approach which is backed by transformational leadership approach (which involves among others public participation and education, interactive forums among stakeholders) greatly helps the water enterprise and the society at large; enhance good governance in urban water service delivery.

Outputs of Urban Drinking Water Supply

The output of water enterprise could be multiple. Based on interview and review of official documents of AUWSSSE the major outputs indicators of the enterprise are (1) volume of water produced and consumed, (2) water and water service revenue, (3) number of clients served, (4) water utilities constructed and maintained (reservoir, treatment plants, boreholes, public stand pipe), length of water distribution network and length of water lines renewed/replaced and maintained, and (5) output related to human resource management.

The amount of water produced by water supply enterprise and consumed by citizens are the major output of the enterprise. The difference between produced and sold water corresponds to water loss, due to illegal connections, authorized but non-billed water, and leakages in the distribution network. It is thus important to go beyond the leakages' hypothesis for water loss, and consider illegal connection and non-billed water as well. It also matters, not equating sold water with consumed water, because a water meter can by read wind instead of water pressure.

In general, the amount of water revenue depends on the amount of water sold according to the meter reading. Consumption increases with the quality of water. In terms of proportion, rich people usually consume more water than poor people. The amount of water consumed could be lower when alternative water sources (e.g. springs) are available. People may prefer alternative water sources because of convenience, free

use, or a better perceived quality. Climate (season and altitude) and culture also play a role. These indicate that increasing supply of water may not increase/optimize water consumption and water revenue.

The amount of revenue collected from water related service (such as water meter rent, permission and estimation fee, and technical service charge) depends on the number of customers and size of water meter (the bigger the size, the higher the rent), number of new connections and cost of connection materials purchased. This shows that the amount of revenue from water related services depends on many factors.

The number of clients served by enterprise through direct/private connections by customer category (House hold, Business and Non- business) and public stand pipe is also the output indicator of water enterprise. Informants told that poor people and students usually use public stand pipe. Furthermore, if the public stand pipe is not nearby, citizens may prefer to buy water from resellers in the neighbourhood at higher price which in turn force them to consume less volume of water. This entails that the water supply enterprise should support and encourage private connection and build public stand pipe at optimal distance as much as possible to meet its objectives.

Constructed and maintained water utilities are also output indicators of water supply enterprise. The number of water utilities constructed and maintained (reservoir, treatment plants, boreholes, public stand pipe) and the length of water distribution network and length of water lines renewed/replaced and maintained (in km) could be objectively measured. The amount depends on many factors such as the financial capacity of the enterprise to increase distribution network, settlement pattern of residents (the more the scattered settlement the higher the length), urban topography (plain slop less length), master plan of the town and position of water utilities (collection chamber, treatment plants and reservoir). Maintenance, renewal/replacement activities are influenced by the quality of constructions, the availability of financial and other inputs (Mersha, 2007). Poor design and construction quality of water utilities leads to frequent maintenance and renewal/replacement which in turn increase repair and maintenance cost. Furthermore, the availability of qualitative human resources also matter: sometimes people with special skills may be needed for repair and maintenance activities. Local community may contribute in cash or in kind to construct and maintain water utilities.

Some outputs of the water enterprise related to people (human resource management functions) are number of job position filled, number of staff trained, improved internal relationship and employee job satisfaction. Overall well internal

integration and equitable treatment of staff members will result in improved internal relationships and employee job satisfaction and hence reduce absenteeism and turnover rates.

Outcomes of Urban Drinking Water Supply

The urban water service has direct and indirect effect on target and non-target group of the society. The outcome can be observed either in the short range or in the long range (OECD, 2009) and can be further divided into intermediate outcome and final outcome (Van Dooren, et al., 2010). The intermediate outcome refers to the immediate effect of an organization/program on society and may be limited to the target group, while final outcome usually affect the general society and the impact is often long lasting.

Similar to other developing countries (Mukokoma and van Dijk, 2013), Ethiopia has adopted New Public Management (NPM) principles to ensure sustainability of water supply since 1999 (MoWR 1999, MoWR 2001). Policy documents (Ethiopia/Oromia National Regional State) focus on demand approach to water service, cost recovery and stakeholders' participation with greater attention to customer oriented public service delivery approach (Getachew, 2005, MoWR 1999, MoWR 2001, Proclamation No. 78/2004). Urban Water Supply and Sewerage Service Proclamation of the Oromia National Regional State (Proc. No. 78/2004) indicates the water service should be in accordance with the standards set by World Health Organization (WHO). National water related policies and strategic documents emphasize outputs and outcomes dimension of performance. The documents focus on efficiency, sustainability, reliability, accessibility and acceptability of water services to users (MoWR, 1999). By the same token the AUWSSSE strategic planning document emphasizes output and outcome. Interestingly too, interviewees and focus group discussants are also very critical about outcome indicators (accessibility, equity, acceptability, sustainability, quality, health (water borne diseases) and socio-economics). Health and socio-economic service belongs by and large to final outcome while other indicators are more of intermediate ones.

Access to improved water is measured in terms of quantity, affordability and timeliness. Interviewees and focus group discussants stressed that quantity of water is the most important indicator of water service. In the absence of adequate supply, citizens/customers prioritize water consumption (first for drinking and cooking, and may totally ignore sanitation), or use alternative water source (protected or unprotected,

buying from vendors). Affordability is another indicator of access to safe drinking water. Affordability has to do with the price or tariff paid by customer for water use and the cost of private connection. The higher the costs compared to their income, the lower the accessibility will be. Interviewees and focus group discussants told people having no private connection use public standpipe and usually pay more price than those who have direct individual connection (Water Utility Partnership Africa, 2003). In terms of timeliness, customers/citizens ideally expect to get water whenever they need without walking more distance, and always prefer private connection. The higher the distance from acceptable range, the less accessible the water service is. In general, access (quantity, affordability and timeliness) is more critical for the poor, children and women and people with special need. In case of poor access, this target group will pay the highest price (WHO, 2004). Therefore, local government should ensure that citizens have reasonable access to safe drinking water (WHO, 2004).

Supply of water service is not just enough. The supplied water should fulfill required quality dimensions (chemical, biological and physical aspect) and should be acceptable to users. For focus group discussants, good water is tasteless, colorless, odorless and cool. They paid much importance to these features.

Equitable distribution of water service is another intermediate outcome in urban drinking water service. Ideally water should be distributed equitably regardless of socio-economic status of users and geographic location. In practice, however, ensuring equitable supply is difficult. Rich people could have better service than poor people, because of the initial connection cost; the poor cannot afford. People living in the city center could get a better access than people living in hilly areas, in the periphery, and/or in slum areas. The distribution of water could be also affected by the size of water meter (the bigger the water meter, the better the access to water). Equitable distribution is an issue particularly when there is shortage of water supply. Focus group discussants also pointed out that existing water tariff rate and the transactional service delivery approach (emphasizing service charge and cost recovery than focus on equity) limits equitable access to water services. The disadvantaged usually have less access and thus more affected than wellbeing parts of society.

Accessibility, quality, and equitable distribution of water are necessary but not sufficient. The supply of water should be sustainable or reliable. Customers expect uninterrupted supply of water. Frequent interruption of water service negatively affects daily basic water needs and socio-economic activities. Furthermore, interruptions of

water supply often lead to the proliferation of pathogens in the water distribution lines, and contamination of water. Thus sustainable and continuous supply of water is an essential outcome indicator of water service.

The community uses water for drinking, cooking, sanitation, medication (to treat patients in hospitals and health centres) and business activities (hotels and other private business). When accessibility, quality and acceptability, degree of equitable distribution, reliability of water is insufficient, it thus has consequences for the health and socio economic conditions of individuals and the operation of business and non-business organizations. When these quality criterions are not met, individuals tend to use water from unprotected sources, running a risk for their health. It also affects private business and other organizations. In worst case it may result in total closure of business activities (hotels, other private business). Lack of water with adequate qualities hinders social interaction because of bad sanitation and results in unwelcoming work environment. In other words, keeping other things constant, communities that have better safe drinking water service will have better health and run socio-economic activities more successfully. And the water enterprise that can deliver better service will have positive relationships with stakeholders (internal and external) and can effectively contribute towards health and socio-economic activities of the society.

HOW TO IMPROVE THE PERFORMANCE OF URBAN DRINKING WATER SUPPLY?

This paper aimed at developing a framework for comparing Ethiopian local governments' performance in water delivery process and at identifying the value citizens could add to it. In the previous section, we detailed the production process of water delivery. This allows us to identify a range of strategies for local governments to improve their performance in delivering drinking water to its citizens. We distinguish between strategies aimed at improving the efficiency and strategies aiming at improving effectiveness.

Efficiency-improving strategies

Improving the efficiency of water delivery consist, for local governments, in ensuring that a maximal quantity of water is delivered to a maximal amount of customers for the lowest price possible. The Ambo case allowed identifying five possible strategies to improve the efficiency.

First, local water enterprises can lead a commercial policy aimed at cost-recovery. This would include the provision of financial disincentives for additional private connections, especially for the poor people and remote places. The case study indeed reveals that the installation of public pipes has a lower cost without affecting the consumed quantities of water that much. A minimally frequent meter reading, by allowing saving on related personnel costs, also delivers efficiency gains. Relatively high tariffs, especially for the uncompressible part of personal consumption, generate good returns on investments, up to a given threshold where customers shift to alternative sources of water.

Second, procurement policies can deliver significant efficiency gains. Because local water enterprises need to buy significant amounts of materials (chemicals, pipes, meters, infrastructures for storage and treatment) to deliver drinking water, it is of outmost importance that the lowest price is obtained for a given quality of material. In this regard, two factors deserve attention: the ability of local water enterprises to coordinate their orders, with an eye on increasing their negotiation power vis-à-vis suppliers, and the extent of competition in the suppliers' market. Examining these factors deserves further research.

Third, the quality of delivered water must be sufficient to be sold to customers. The Ambo case indeed revealed that customers have alternatives to the monopolistic supply of water by the local government's enterprise: they can collect and consume rainwater on their own, can travel to natural springs to fetch water, or consume bottled beverages. They tend to shift to these alternative sources when they doubt of the water quality on grounds of bad color, odor or taste, or of possibly water-induced sickness in the neighborhood. A water enterprise wanting to sell its production can improve the intrinsic quality of water and improve the perceived quality.

To this and other ends, stakeholder management appears to be a crucial strategy to improve efficiency and legitimacy of local government. It consists in sharing the production costs with the community by involving them in the production process. This can happen at least on two ways. On the one hand, many treatment costs flow from polluted water. And pollution mainly results from waste disposal in surface water, or above or near ground water sources. Citizens, businesses, and farmers should be sufficiently informed, incentivized and regulated to avoid such pollution and related costs. Also, because intrinsic and perceived quality of water influence the revenues, customers should be trained to systematically boil the water in case of insufficient quality.

Sharing the costs – and benefits – of quality management with the community can lead to significant efficiency gains as well as improved citizens – local government partnership.

Finally, the sources of water used have an impact on efficiency. The Ambo case reveals that the treatment costs are higher for surface than ground water. Furthermore, ground water has the unique advantage of predictability: its quality and quantity does not depend as much on the last rainfalls and other climatic events as with surface water. Thus, this pleads for a preferential reliance on ground waters, when available.

Effectiveness-increasing strategies

To increase effectiveness means, for local government's water enterprises, improving the accessibility of water, its quality, the equitability of supply, and the reliability of the service. The Ambo case delivered a number of insights onto the way of improving effectiveness.

We observed that some strategies allow improving several factors of effectiveness at the same time.

The reliance on ground instead of surface waters is an example of such strategies. Treatment does not always suffice to bring surface waters to acceptable levels of quality. Moreover, the quality of surface waters is subjected to seasonal variation (high turbidity during summer season), and an excessive reliance on it can lead to service interruptions. In such cases, the absence of water in the distribution lines leads to corrosion and proliferation of bacteria, ultimately damaging the quality and acceptability of upcoming flows of water.

A proper maintenance of the distribution network appears essential as well. A poor maintenance generally results in leakages. Leakages can lead to contamination of water, interruption of services, and water with bad odor, color and taste. Maintenance, by preventing and repairing leakages, contributes to the quality, reliability and acceptability of water.

Stakeholder management to protect catchment areas, to train customers to test and improve water quality, not only help mobilize support but also help to ensure continuous supply of power to avoid service interruptions, can provide a significant contribution to effectiveness.

The Ambo case also reveals that the equitability is mainly achieved by a reliable supply of qualitative water. Indeed, the poor people pay the highest price for a water of

insufficient quality or quantity: they can't afford buying water from other sources, have hence to travel long distances to collect water elsewhere and/or face risks for their health when consuming it.

Finally, there exist specific strategies for certain facets of an effective water delivery. The chemicals used in the treatment process will significantly impact quality: their quality and quantity matter in that framework. The commercial policies also will have the greatest impact on equitability: the initial costs of private connections can prevent poor people from accessing water, as do the consumption tariffs. Seen through the lens of equitability, the water enterprise therefore needs to revisit commercial policies.

On the added-value of citizen involvement

Willing to provide a local Ethiopian version of the water production process and to examine whether citizens could indeed add much value to it, as hypothesized by post-New Public Management theories, we notably relied on a focus group with representatives of Ambo citizens to answer our main research question. In this section, we would like to draw some preliminary lessons from this experience.

The focus groups showed, first, that there are no particular technical, financial or practical barriers preventing AUWSSSE from routinely collecting input from citizens. Ambo citizens have been perfectly able to provide us with empirical evidence about the water production process and its shortcomings, and to consensually agree on the performance indicators they considered most important.

Second, the focus group emphasized that Ambo citizens can significantly impact the water delivery process and its performance. For instance, many treatments costs arise out of pollution of water sources by citizens. Also, by boiling distributed water, citizens can share the treatment costs with the water company, and contribute to an overall better performance. This experiment thus suggests that citizen involvement could be a win-win situation.

Of course, the interests of citizens and Water Company don't always converge. The most striking example was the commercial policy, where AUWSSSE's pursuit of efficiency comes at cost of the value for Ambo citizens. For instance, public pipes cost less and provide more revenues to AUWSSSE than the private connections Ambo citizens unambiguously prefer. Similarly, frequent and precise meter reading tends to oppose corporate and citizen interests.

Interestingly, the focus group also emphasized that citizens have alternatives to the monopolistic supply of water by AUWSSSE: when the quality of the water provided is below acceptable standards, they collet water on their own, leading to lower revenues for the company. This shows that Ambo citizens not only have 'voice', but can rely on 'exit' strategies as well (Hirschmann, 1970).

As a conclusion of the focus group discussion, one participant distinguished two models of water delivery service. In the transactional model, producers and consumers exchange a good – water in this case – for money; in the transformational model, citizens and government co-produce public value through water. The former sees water delivery as the end, and sets efficiency as the criterion of success. For the latter, instead, water is but a mean for an end (health, nutrition, human dignity, economic activity), and the attainment of these final outcomes or the effectiveness should be these criterions by which the co-production-process should be evaluated. Indeed, the transformational model involves citizen in all stages of the water delivery process: not only priority setting, but also the protection of catchment areas, the complementary treatment of water, etc…

Overall, our focus group in Ambo suggests that the participation of citizens in decision-making is positive for both parties, citizens proving able to provide clear input to the water company as to its preferences. Embracing co-production and the transformational model is, however, one step further: it would imply a preference for effectiveness over efficiency, and a significant contribution of citizens to it.

To put it somewhat differently, a water company wanting to improve its effectiveness may be well advised to share the whole production process with the citizens. Further research is of course needed to confirm this rather positive impact of citizen involvement on government performance.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Building on a case-study of Ambo local government, this paper has operationalized Pollitt and Bouckaert's (2004) production process model for water service delivery, in order to define performance indicators and activate popular participation at local to improve performance.

The production process for water delivery starts with three inputs: sources of water, human resources and other nonhuman resources. These inputs are converted into outputs through two ranges of activities; operational and management ones. Operational activities involve catchment, treatment and distribution of water. These operational

activities are supported by management activities relative to investment decisions, commercial policies, participatory processes, with customers or other public organizations. These activities lead to outputs, essentially: cubic meters of water (produced, sold, consumed and leaked), financial revenues for the enterprise, number of customers, and output related to water utilities and human resource management. This production chain should lead to effective water supply, what customers define in terms of equitability, quality, reliability, accessibility and acceptability.

Operationalizing this production process allowed devising a number of strategies to improve efficiency and effectiveness of water delivery, and activate citizens-local government interaction. Interestingly, while public administration literature has repeatedly emphasized a trade-off between efficiency and effectiveness (Kim, 2000; Pollitt & Bouckaert, 2011), we find in the Ambo case a surprising number of strategies simultaneously contributing to efficiency and effectiveness. As such, they deserve being implemented by local governments' water enterprise:

- Investing in maintenance of the distribution network to avoid leakages. It contributes to efficiency by reducing water loss, and to effectiveness by avoiding contamination of water, interruption of service and bad color, odor and taste;
- Involving the community into the production process. External actors influence the performance of water enterprise: farmers, whose agricultural activities can pollute raw water, energy suppliers, whose poor performance can lead to interruptions of service, and customers, who could test and improve water quality on their own. These actors can help the water enterprise to manage these risks for the performance of urban drinking water supply and hence deserve being involved in the production process;
- Ensuring a minimal quality of water. Below that threshold, customers rely on alternative water sources, at their own costs and risks, and it negatively affects the revenues of the water enterprise.

This case study also allowed identifying strategies that contribute to efficiency or effectiveness without negatively affecting the other. Provided that further analysis of precise financial parameters confirms their positive effect, these strategies could be implemented too:

- Improving procurement policies. Water enterprises could get better prices by coordinating their purchases, provided that the market can operate more or less freely;
- Relying on ground water. Overall, the risks for quality, interruption of service and color, odor and taste of water appear to be lower and, above all, more predictable with ground than surface waters.

Finally, there are strategies implying a choice between – and thus a renunciation of – the improvement of efficiency or of effectiveness. Local policymakers are thus invited to determine an equilibrated mix between efficiency and effectiveness through:

- Commercial policies. Increasing coverage happens preferably through public pipes if efficiency is the main concern, and through private connections if an equitable, effective service is preferred. Also, the water enterprise may prefer politically less attractive strategy such as neglect unserved or underserved citizens and serve big consumers to improve efficiency, and revisit commercial policies aimed at effectiveness;
- Highest quality of water. Effectiveness requires a continuous improvement of water quality; efficiency recommends not investing in quality above a threshold where customers don't rely on alternative sources anymore.

This study had as aim to develop a framework able to compare Ethiopian local government's performance in water delivery and to stimulate policy discussion and dialogue, taking Ambo as case study. The paper emphasizes citizen-local government partnership and participatory local governance to improve performance and accountability. Elements of the production model enable actors to renegotiate goals and improve performance. It brings into effect a citizen-centred service delivery which in turn may consolidate the relationship between citizens and local government. To this end, focus group discussion with citizens clearly revealed that provisional approach backed by transformational leadership is useful to structurally integrate citizens into the production process. The performance-improving strategies identified in this paper are a first step in that direction. These findings now need to be confronted with international literature and with other comparable cases in the Oromia region. Then, the framework needs to be tested, in order to better understand the causes of good/poor performance,

to create a benchlearning platform for local governments to learn from one another, and, ultimately, to improve water delivery and better achieve development goals.

ACKNOWLEDGMENTS

The authors gratefully acknowledge AUWSSSE for providing useful documents, and interviewees and focus group discussants for their cooperation and sharing their opinions and expectations.

This study has been carried out in the framework of the academic cooperation to development project "Strengthening Institutional Capacity to Support Public Administration and/or Development Management Programmes at Ambo University" between KU Leuven University and Ambo University, financed by VLIR-UOS (Belgium).

ANNEXES

Position of interviewee	**Organization**	**Length of interview**	**Major issues discussed**
Human Resource and Logistic Administration Process Team leader	AUWSSSE	1 hour	Major activities of the unit / enterprise Inputs , outputs and outcomes Major challenges
Customer Service head	AUWSSSE	40 min.	Major activities of the unit/ enterprise Input , outputs and outcomes Major problems/ grievances/
Water facility supply process team Leader	AUWSSSE	55 min.	Major activities in water production, distribution and utilization process Inputs, outputs and outcomes Problems and challenges
Planning and Budgeting Head	AUWSSSE	50 min.	Major activities of enterprise/ unit Inputs, outputs and outcomes Problems and challenges
Customer (male)	House hold head	20 min.	Purpose of water use Expectations and problems Impact of availability/ unavailability of water
Customer (female)	Private business operator (Juice shop)	20 min.	Purpose of water use Expectations and problems Impact of availability/ unavailability of water
Hydro-geologist (Zonal expert)	West Shoa Zone Water, Minerals and Energy Office	50 min.	Technical issues in urban water supply, water sources , design
Lecturer and researcher (Civil engineer)	Ambo University	50minute	Technical issues in urban water supply, water source , design

Annex 1 – Profile of interviewees and major issues discussed

Annex 2 – Profile of focus group discussant and major issues discussed

Major items	**Budget code**	**Number of total sub items**
Revenue	4000 (41000-41090)	Major sources of revenue include; water sale (direct connections), water sale (community tap), water meter rent, sale of different items, estimation and Permission fee, technical service charge, excavation and refilling clients' deposit and others

Gender		Age			Stay in Ambo (years)			Occupation(organization)			Community role[7]		Major issues
M	F	25-35	36-45	40-60	5-10	11-15	>15	Public	NGO[8]	University	Community leader	Resident	Expectations, problems, impact
8	1	3	2	4	1	4	4	3	4	2	1	8	

Costs/ expenses	5000 (51000- 57130)	**Direct water production cost (5100)** include direct material cost, chemicals, direct labor cost, indirect cost, power and diesel (water production) **General Administrative Overhead cost (51400**) include salary, wage, salary (contract employees), overtime payments, annual leave payments, office supplies, employment termination compensation, third party compensation, severance pay maternity leave and acting allowance. **Overhead cost – employee benefits (52000)** include per diem and travel allowance, insurance, uniform and Safety tools, medical expenses, education and training, hardship allowance and employer contribution to pension. **Services (53000)** include electric power expenses, water supply service, telephone, and other payments (machineries and other rent)

[7] Three persons were health professionals of which one has his own health center (Ambo University staff)
[8] NGOs (Safe the children and Ethiopian Red Cross (West Shoa), Community leader (church) and 1 person from AUWSSSE

		Repair and maintenance (54000) include Civil and Head Works, repair and maintenance of water lines, other repair and maintenance (office, equipment.) **Advertisement, Printing and services (55000)** **Payment for equipment and supplies purchased (57000)** include generator, electric supplies, vehicle spare parts, vehicle tire, cleaning supplies, office supplies, fuel and lubricant, and others
Major issues		
(1) Water production, (2) Water consumption, (3) Non-revenue water, (4) Customer service (number), (5) Maintenance and replacement (old pipe, surface pump, switch board, water meter), (6) Construction and water line network expansion and improvement, (7) Purchase of equipment, chemicals, (8) Printing different invoices and purchase workers uniform, (9) Power and chemical use (Power and fuel for water production, and chemicals for water treatment)		

Annex 3. Major budget lines and major issues in AUWSSSE (Source: AUWSSSE, 2011; 2012; 2013)

REFERENCES

Ambo Urban Water Supply and Sewerage Service Enterprise (2011). Annual performance report (2010/11 fiscal year

Ambo Urban Water Supply and Sewerage Service Enterprise (2012). Annual performance report (2011/12 fiscal year)

Ambo Urban Water Supply and Sewerage Service Enterprise (2013). A 2013/14 fiscal year planning and budget document

Ambo Urban Water Supply and Sewerage Service Enterprise (2011). BSC based Strategic Plan (2011-2015)

Ambo Urban Water Supply and Sewerage Service Enterprise job and structure document

Ammons, D. (1996). Municipal Benchmarking, Assessing local performance and establishing community standards , Sage publication , London

Banerjee, S., Skilling, H., Foster, V., Briceño-Garmendia, C., Morella, E., & Chfadi, T. (2008), Ebbing Water, Surging Deficits: Urban Water Supply in Sub-Saharian Africa, AICD Background Paper, Washington D. C.: World Bank.

Bouckaert, G. and Halligan, J. (2008) Managing performance, international comparisons, Routledge Taylor &Francis Group , London and New York

Dan, S. (2014) The effects of agency reform in Europe: A review of the evidence, Public Policy and Administration, http://www.sagepublications.com

Fita, C. (2011). An Assessment Of Urban Water Supply And Sanitation: The Case Of Ambo Town, Oromia Region, Addis Ababa University, Master Thesis, Accessed August, 2014

Fogarty, J. and Mugera, A. (2013). Local government efficiency: Evidence from Western Australia, Economic Review , Vol. 40.No 3, Welly Publishing Asian Pty limited

Gadgil, A. (1998). Drinking Water in Developing Countries, Annual Reviews, Annu.Rev. Energy Envision; Accessed on July, 2013.

Getachew, Z. (2005). Determinants of Sustainable Rural Water Supply System in Ethiopia *The Case Of Two Rural Water Supply Systems: Amuyee Serra And Habru Seftu Schemes,* Addis Ababa University Master's thesis, Accessed August, 2014

Grauberg, G. (2008). Efficiency: the electrical imperative, in Efficient local government, edited by Bennett Mike and Hill Robert , Solace Foundation Imprint

Hill, R. (2008). Efficiency as a culture, edited by Bennett Mike and Hill Robert , Solace Foundation Imprint.

Hirschmann (1970), Exit, Voice and Loyalty: Responses to Decline in Firms, Organizations, and States, Cambridge: Harvard University Press, 176 p.

IWA (2013); IWA Water Utility Efficiency Assessment Matrix: A Quick Reference Guide, UK: IWA, 26 p.

Jacobs, et al (2011). Measuring Efficiency in Health Care, Analytic Techniques and Health policy, Cambridge University Press.

Kim Pan Suk (2000). Administrative Reform in the Korean Central Government: A Case Study of the Dae Jung Kim's Administration Public Performance & Management Review, Vol. 24, No. 2 pp. 145-160 Published by: M.E. Sharpe, Inc

Kinder, Tony. 2012. "Learning, Innovating and Performance in Post-New Public Management of Locally Delivered Public Services." *Public Management Review* 14 (3): 403-28.

Leftwich, A. (1994). Governance, the State and the Politics of Development, Development and Change Vol. (25) , Institute of Social Studies , Blackwell Publisher, UK

Mersha, S. (2007). Evaluation of Technical Sustainability of Rural Water Supply Projects in the Amhara Regional State Case Study In South Wollo, Addis Ababa University, Master's Thesis, Accessed August, 2014

Ministry of Water Resources (MoWR) (1999). Ethiopian Water Resources Management Policy, Accessed August, 2014

MOFED & United Nations Country Team Ethiopia (2012), Assessing Progress Towards the Millenium Development Goals, Addis Ababa: MOFED.

MOFED (2010), Growth and Transformation Plan 2010/11 – 2014/15, Addis Ababa: MOFED.

MoWR (2001). Ethiopian Water Sector Strategy, Accessed August, 2014

Mukokoma, M. & van Dijk, M.(2013) New Public Management Reforms and Efficiency in Urban Water Service Delivery in Developing Countries: Blessing or Fad?, *Public Works Management Policy*, http://www.sagepublications.com

OECD (2009). Measuring Government Activity, OECD . org

Oromia National Regional Government (2003). Urban Local Government Proclamation (Proc.No.65/2003), Megeleta Oromia, Finfine.

Oromia National Regional Government (2004). A proclamation to Provide for the Establishment of Urban Water Supply and Sewerage Service Enterprise of the Oromia Regional State (Proclamation No. 78/2004 (2004), Megeleta Oromia , Finfine.

Pollitt, C. & Bouckaert G. (2004), Public Management Reform: A Comparative Analysis, 2nd ed., Oxford: Oxford University Press.

Pollitt, C. & Bouckaert, G. (2011). Public Management Reform; A comparative Analysis: New Public Management, Governance and the Neo- Weberian State , third ed. Oxford University Press , New York

Pollitt,C & Dan, S. (2013). Searching For Impacts in Performance-Oriented Management Reform: A Review of the European Literature, Public Performance & Management Review, Vol. 37, No. 1, September 2013, pp. 7–32. M.E. Sharpe, Inc.

Shanmugham, S. & Tekle, S. (2011). An Assessment On The Status Of Water Supply And Sanitation In Ethiopia: A Case Of Ambo Town, Journal of Sustainable Development in Africa Volume 13, No.1, pp 23-43.

Stroobants, J. & Bouckaert, G. (2013). Towards Measurable and Auditable Efficiency Gains in the Flemish Public Sector, Public Organization Review, A Global Journal, Springer Vol.13 No. 3, 245-260

Stroobants, J. & Bouckaert, G. (2014), Benchmarking local public libraries using non-parametric frontier methods: A case study of Flanders, Library and Information Science Research, 36, 211-24.

UN (2010), Resolution adopted by the General Assembly on 28 July 2010: The Human Right to Water and Sanitation, United Nations A/RES/64/292, 3 p.

UN-Habitat, (2003) .United Nations Human Settlements Program: Improving the lives of 100 million slum dwellers; towards the millennium Development Goals, Nairobi Kenya

United Nations Educational, Scientific, & Cultural Organization World Water Assessment Program (UN-WATER/WWAP) (2006/7). National Water Development Report for Ethiopia (Final) December 2004, Addis Ababa

Van Dooren, W, Bouckaert,G.& Halligan, J. (2010). Performance Management in the Public Sector, Routledge Taylor & Francis Group, London and New York

Water Utility Partnership Africa (2003). Better water and sanitation for the urban poor; Good Practice from Sub-Saharan Africa, Kenya.

Woodybury, K. & Dollery, B. (2004). Efficiency Measurement In Australian Local Government: The case of New South Wales Municipal Water Service; The Policy Studies Association, Vol 21. No.5

World Bank (2013) .Federal Democratic Republic of Ethiopia Public Sector Reform Approach Building the Developmental State – A Review and Assessment of the Ethiopian Approach to Public Sector Reform, The World, USA, Washington DC.

World Health Organization (2004). Guidelines for Drinking-water Quality Vol.1. 3rd, WHO, Accessed August 2014

World Health Organization (2009). Water Safety Plan Manual: Step-by-step risk management for drinking-water suppliers, WHO, Accessed August 2014

Wutich, A. & Ragsdale, K. (2008), Water insecurity and emotional distress: Coping with supply, access, and seasonal variability of water in a Bolivian squatter settlement Social Science & Medicine, Elsevier Ltd www.elsevier.com

Yacob, A., Mekonnen, E., Gudisa, D., Achiso, D., O'Meally, S., Calow, R. & Ludi, E. (2010), Governance and Drivers of Change in Ethiopia's Water Supply Sector, London: DI/OSSREA.

Yetano, A. (2013). What Drives the Institutionalization of Performance Measurement and Management in Local Government? Performance & Management Review, Vol. 37, No. 1, September 2013, pp. 7–32. M.E. Sharpe, Inc.

Zenewi, M. (2006). African Development: Dead Ends and New Beginnings, Preliminary Draft, accessed on, January 05, 2015.

Zhou Yi Vairavamoorthy K., Mansoor M.A.M (2009). Integration of urban water services, Published by Elsevier B.V.